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# PARTICIPATION OF SMALL FARMERS IN TECHNOLOGY ASSESSMENT: EXPERIENCES WITH BEANS (Phaseolus vulgaris L.) AND ROCK PHOSPHATE



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This research is concerned with testing models for agricultural research which involve participation by farmers in technology assessment. These models address two key requirements of adaptive research for small farm systems: first, improvement of feedback between farmers and researchers about the potential acceptability of technology; and second, the need to account for the location specificity and diversity of needs, goals and resources of small farmers. Research on approaches to involving small farmers in on-farm testing of fertilizer technology in the IFDC/CIAT Phosphorus Project, Colombia, South America, compared different methodologies for farmer participation in farm trials. In trials with bush beans in a traditional fallow-land rotation system,

three types of farmer participation were compared: 1) nominal farmer participation in researcher-managed trials; 2) consultative farmer participation in trials where researchers actively consulted with farmers and farmers implemented management operations; 3) decision-making participation in which farmers were involved in design of on-farm trials, and in making independent decisions about trial management.

On-farm testing of indigenous rock phosphate fertilizers by the Phosphorus Project, a collaborative research effort of the International Fertilizer Development Center (IFDC) and the International Center for Tropical Agriculture (CIAT), in Colombia, South America, proposed to investigate to what extent the agronomic potential of local phosphate materials identified in experiment station research, could be realized in the soils, climate and management conditions found on small farms in Colombia. The research design proposed to involve farmers in the management of bean trials in order to evaluate the agronomic performance and economic potential of the new fertilizers under farmers' conditions, and to obtain information on their acceptability to farmers.

Research on farmer participation in fertilizer testing was divided into two stages. The first stage concerned farmer participation in the definition of experimental design for on-farm trials. The second stage of the research investigated how different types of farmer participation affect the management of on-farm trials, the agronomic results obtained, and the assessment of these results by researchers and farmers.

The effect of farmer decision-making participation on experimental design was evaluated by development of a "Farmer design" for testing finely ground rock phosphate which was compared with researchers'

"Agronomic design" for the bean trials. The Farmer design showed that farmer participation provides a link between farmer experimentation or "informal research" and formal technology testing procedures. Farmer participation in trial design introduced additional evaluation criteria not considered in the Agronomic design.

The Farmer design facilitated feedback between researchers and farmers by focussing on the compatibility between new fertilizer technology and farmers' current technology, in a way that ensure that criteria directly relevant to use of finely ground rock phosphate by farmers under local circumstances were included in the evaluation of the technology. Confronting location-specific adaptations of the technology provided a second type of feedback to researchers, because new questions were raised about the chemical reactions of rock phosphate with organic fertilizers and in mixtures with conventional P sources. These then formed a basis for further bean trials in 1983; and for new experiment station research.

Different types of farmer participation in bean trials were associated with different approaches to trial management. Comparison of farmer inputs to different types of trials showed differences in practices for pest and disease control, a non-experimental variable in the trials. The effect of consultative participation was to reduce or remove uncertanty for farmers about use of agrochemicals on beans.

Different approaches to involving farmers in the management of trials tended to produce a "yield gap" between treatments managed by consultative participants (which received a qualitative upgrading in techniques of pest and disease control) and treatments managed by

decision-making participants. When researchers allowed farmers to make autonomous decisions about trial management, bean yields for any given experimental treatment were lower than when researchers were actively consulting with farmers about trial management. Consequently conclusions about the economic potential of different treatments diverged substantially, depending on whether they had managed by decision-makers or consultative participants.

Results from the Farmer design were evaluated with farmers. Data were presented in terms of the criteria farmers themselves use to evaluate the crop. One result was that farmers indicated preferences for different options, suited to different circumstances, rather than one "best" treatment. Farmers' reasoning for these choices reflected values which related to the role of the crop in their whole farming system.

This research shows that there can be significant improvements in the process of identifying potential technologies for small farmers by introducing farmer participation at an earlier stage in on farm research than is usually conceived of as appropriate. That is, formal proceedures can be adopted by on-farm researchers to familiarize themselves with farmer experimentation and to integrate this activity into technology testing by involving farmers in the design of experiments.

This research also shows how important it is to define systematically, modes of conduct for research staff in the management of on-farm trials when the objective is to test technology under farmer-managed conditions. Active consultation by research staff with farmers managing trials can produce a different style of management, different results

and hence different conclusions from a passive, observer role for researchers in trial management, and decision-making type of participation by farmers.

Farmer participation in evaluation of apparently complex technological alternatives is possible if the results of trials are expressed in terms of farmers' own criteria. This research shows that farmer participation in experimental design and in evaluating the results of on-farm trials can be an effective way of introducing into testing proceedures, the values and goals of farmers which are not readily apparent to researchers.

Appendix IV. NPK rates derived for Farmer design, bush beans, Pescador, Cauca, Colombia, 1982.

| Treatment Number | Fertilizer Source | | Rates kg/ha N | P | K |
|---|---|---|---|---|---|
| 1 | Chicken manure | | 236.2 | 8.2 | 96.7 |
| 2 | Chicken manure | | 118.1 | 4.1 | 48.4 |
| 3 | Mixture: | Chicken manure | 118.1 | 4.1 | 48.4 |
| | | PR Huila | - | 35.0 | - |
| | | Total | 118.1 | 39.1 | 48.4 |
| 4 | Mixture: | Chicken manure | 118.1 | 4.1 | 48.4 |
| | | PR Huila | - | 70.0 | - |
| | | Total | 118.1 | 74.0 | 48.4 |
| 5 | Mixture: | Chicken manure | 118.1 | 4.1 | 48.4 |
| | | PR Huila | - | 140.0 | - |
| | | Total | 118.1 | 144.1 | 48.4 |
| 6 | 10-30-10 | | 53.4 | 70 | 44.3 |
| 7 | 10-30-10 | | 26.7 | 35 | 22.2 |
| 8 | Mixture: | 10-30-10 | | 35 | |
| | | PR Huila | | 35 | |
| | | Total | 26.7 | 70 | 22.2 |
| 9 | Mixture: | 10-30-10 | | 35 | |
| | | PR Huila | | 70 | |
| | | Total | 26.7 | 105 | 22.2 |
| 10 | Mixture: | 10-30-10 | | 35 | |
| | | PR Huila | | 140 | |
| | | Total | 26.7 | 175 | 22.2 |
| 11 | No fertilizer | | 0 | 0 | 0 |
| 12 | Own standard practice | | -variable from farmer to farmer- | | |